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EXAMINER	
ALEJANDRO MULERO, LUZ L	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 09/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/787,461	YAKUSHIJI ET AL.	
	Examiner	Art Unit	
	Luz L. Alejandro	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6 and 9-21* is/are pending in the application.

4a) Of the above claim(s) *4,6,9-12,15,16 and 19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *1,3,5,13,14,17,18,20 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of the invention of group I in the reply filed on 07/10/06 is acknowledged. Furthermore, applicant's election with traverse of specie A in the reply filed on 7/10/06 is acknowledged. The traversal is on the ground(s) that examiner's statement that there is no generic claims is wrong. This is not found persuasive because the restriction itself is proper, however, the examiner agrees with applicant's listing of the generic claims and therefore these claims will be examined on their merits.

The requirement is still deemed proper and is therefore made FINAL.

Claims 4, 6, 9-12, 15-16, and 19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3, 5, 13-14, 17-18, and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukamoto, U.S. Patent 5,868,848 in view of Hirose, US

2004/0211518 or Steger, U.S. Patent 5,085,727 or Singh et al., US 2004/0231800 and Tahara et al., U.S. Patent 5,356,515.

Tsukamoto shows the invention as claimed including a plasma etching apparatus for etching, comprising: a semiconductor ring 18 formed of silicon disposed on an outer circumference of a substrate W to be processed, and having a bias voltage 43 applied to the ring (see figs. 1-3 and their description).

Tsukamoto is applied as above but do not expressly disclose a resin layer formed of a carbon material disposed on an inner wall surface of a processing chamber, and a source of an additive gas containing carbon monoxide, to be added to an etching gas supplied to the processing chamber. Hirose discloses a resin layer applied to a wall surface to prevent wear to the wall surface (see paragraph 0013). Alternatively, Singh et al. discloses a carbon containing polymer layer 140 in a plasma processing chamber (see fig. 3A and its description). Moreover, Steger discloses a carbon coating formed on inner walls of the processing chamber (see abstract). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Tsukamoto so as to have a carbon material on the inner wall surface of the processing chamber because the chamber can be easily cleaned and protected from long term wear.

Furthermore, Tahara et al. discloses a source (144a or 144b) of an additive gas containing carbon monoxide, to be added to an etching gas (142 or 143) supplied to the processing chamber (see Figs. 1-3 and their description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was

made to modify the apparatus of Tsukamoto modified by Hirose or Singh et al. or Steger so as to include a gas source containing carbon monoxide to be added to the etching gas if the process being conducted within the apparatus requires such a gas.

With respect to etching an organic film, at least either a material or a size of a susceptor member disposed between said ring and an electrode is adjusted according to an area to be etched on said substrate, the flow ratio of the etching gas to the additive gas, the bias voltage applied such that silicon-based plasma products generated in a plasma process using the plasma etching apparatus can be deposited stably on the ring, and wherein the resin layer and the additive gas are provided such that during operation of the apparatus for an etching process, wherein silicon-containing components are generated, the generated silicon-containing components bond to carbon of at least one of the additive gas and the resin layer and are evacuated from the processing chamber, the claims are directed to method limitations instead of apparatus limitations. However, since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Tsukamoto modified by Hirose or Steger or Singh et al. and Tahara et al. is capable of conducting the claimed processes. For example, note that the apparatus of Tahara et al. includes mass flow controllers 145 for controlling the flow rate of the source of carbon monoxide and the etching gas individually.

Claims 1, 3, 5, 13-14, 17-18, and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi et al., U.S. Patent 6,719,875 in view of Ma et al., U.S. Patent 6,554,954 or Li et al., U.S. Patent 6,506,685 and, Hirose, US 2004/0211518 or Steger, U.S. Patent 5,085,727 or Singh et al., US 2004/0231800, and further in view of Tahara et al., U.S. Patent 5,356,515.

Ohmi et al. shows the invention substantially as claimed including a plasma etching apparatus, comprising: a ring 107 disposed on an outer circumference of a substrate to be processed, and having a bias voltage applied to the ring (see fig. 1 and its description).

Ohmi et al. does not expressly disclose where the ring is a semiconductor, a resin layer formed of a carbon material disposed on an inner wall surface of a processing chamber, and a source of an additive gas containing carbon monoxide, to be added to an etching gas supplied to the processing chamber. Ma et al. discloses a ring 52 disposed on an outer circumference of a substrate to be processed from a semiconductor (see fig. 1 and its description, particularly col. 5-lines 4-12). Alternatively, Li et al. discloses a ring 218 disposed on an outer circumference of a substrate 214 to be processed from a semiconductor (see fig. 3 and its description). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Ohmi et al. so as to construct the ring of a semiconductor because a semiconductor such as silicon is

shown to be a suitable material for a ring which surrounds the outer circumference of a substrate to be processed.

Furthermore, Hirose discloses a resin layer applied to a wall surface to prevent wear to the wall surface (see paragraph 0013). Alternatively, Singh et al. discloses a carbon containing polymer layer 140 in a plasma processing chamber (see fig. 3A and its description). Moreover, Steger discloses a carbon coating formed on inner walls of the processing chamber (see abstract). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Ohmi et al. modified by Ma et al. or Li et al. so as to have a carbon material on the inner wall surface of the processing chamber because the chamber can be easily cleaned and protected from long term wear.

Furthermore, Tahara et al. discloses a source (144a or 144b) of an additive gas containing carbon monoxide, to be added to an etching gas (142 or 143) supplied to the processing chamber (see Figs. 1-3 and their description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Ohmi et al. modified by Ma et al. or Li et al. and Hirose or Singh et al. or Steger so as to include a gas source containing carbon monoxide to be added to the etching gas if the process being conducted within the apparatus requires such a gas.

With respect to etching an organic film, at least either a material or a size of a susceptor member disposed between said ring and an electrode is adjusted according to an area to be etched on said substrate, the flow ratio of the etching gas to the

additive gas, the bias voltage applied such that silicon-based plasma products generated in a plasma process using the plasma etching apparatus can be deposited stably on the ring, and wherein the resin layer and the additive gas are provided such that during operation of the apparatus for an etching process, wherein silicon-containing components are generated, the generated silicon-containing components bond to carbon of at least one of the additive gas and the resin layer and are evacuated from the processing chamber, the claims are directed to method limitations instead of apparatus limitations. However, since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Ohmi et al. modified by Ma et al. or Li et al. and Hirose or Steger or Singh et al. and Tahara et al. is capable of conducting the claimed processes. For example, note that the apparatus of Tahara et al. includes mass flow controllers 145 for controlling the flow rate of the source of carbon monoxide and the etching gas individually.

Claims 1, 3, 5, 13-14, 17-18, and 20-21are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi et al., U.S. Patent 6,719,875 in view of Nowak et al., U.S. Patent 5,865,896 or Tsukamoto, U.S. Patent 5,868,848 and, Hirose, US 2004/0211518 or Steger, U.S. Patent 5,085,727 or Singh et al., US 2004/0231800, and further in view of Tahara et al., U.S. Patent 5,356,515.

Ohmi et al. shows the invention substantially as claimed including a plasma etching apparatus, comprising: a ring 107 disposed on an outer circumference of a substrate to be processed, and having a bias voltage applied to the ring (see fig. 1 and its description).

Ohmi et al. does not expressly disclose where the ring electrode is composed of a semiconductor, a resin layer formed of a carbon material disposed on an inner wall surface of a processing chamber, and a source of an additive gas containing carbon monoxide, to be added to an etching gas supplied to the processing chamber. Nowak et al. discloses an electrode 24 composed of a semiconductor (see fig. 1 and its description). Furthermore, Tsukamoto also discloses an electrode 18 composed of a semiconductor such as silicon (see figs. 1-3 and their description). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Ohmi et al. so as to include a ring made of semiconductor because both Nowak et al. and Tsukamoto shows semiconductor to be a suitable material for electrodes.

Furthermore, Tahara et al. discloses a source (144a or 144b) of an additive gas containing carbon monoxide, to be added to an etching gas (142 or 143) supplied to the processing chamber (see Figs. 1-3 and their description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Ohmi et al. modified by Nowak et al. or Tsukumoto and Hirose or Singh et al. or Steger so as to include a gas source containing carbon

monoxide to be added to the etching gas if the process being conducted within the apparatus requires such a gas.

With respect to etching an organic film, at least either a material or a size of a susceptor member disposed between said ring and an electrode is adjusted according to an area to be etched on said substrate, the flow ratio of the etching gas to the additive gas, the bias voltage applied such that silicon-based plasma products generated in a plasma process using the plasma etching apparatus can be deposited stably on the ring, and wherein the resin layer and the additive gas are provided such that during operation of the apparatus for an etching process, wherein silicon-containing components are generated, the generated silicon-containing components bond to carbon of at least one of the additive gas and the resin layer and are evacuated from the processing chamber, the claims are directed to method limitations instead of apparatus limitations. However, since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Ohmi et al. modified by Nowak et al. or Tsukumoto and Hirose or Steger or Singh et al. and Tahara et al. is capable of conducting the claimed processes. For example, note that the apparatus of Tahara et al. includes mass flow controllers 145 for controlling the flow rate of the source of carbon monoxide and the etching gas individually.

Claims 1, 3, 5, 13-14, 17-18, and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., U.S. Patent 6,232,236 in view of Ma et al., U.S. Patent 6,554,954 or Li et al., U.S. Patent 6,506,685 and, Hirose, US 2004/0211518 or Steger, U.S. Patent 5,085,727 or Singh et al., US 2004/0231800, and further in view of Tahara et al., U.S. Patent 5,356,515.

Shan et al. shows the invention substantially as claimed including a plasma etching apparatus, comprising: a ring 220 disposed on an outer circumference of a substrate to be processed, and having a bias voltage 242 applied to the ring (see fig. 2 and its description).

Shan et al. does not expressly disclose where the ring is a semiconductor, a resin layer formed of a carbon material disposed on an inner wall surface of a processing chamber, and a source of an additive gas containing carbon monoxide, to be added to an etching gas supplied to the processing chamber. Ma et al. discloses a ring 52 disposed on an outer circumference of a substrate to be processed from a semiconductor (see fig. 1 and its description, particularly col. 5-lines 4-12). Alternatively, Li et al. discloses a ring 218 disposed on an outer circumference of a substrate 214 to be processed from a semiconductor (see fig. 3 and its description). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. so as to construct the ring of a semiconductor because a semiconductor such as silicon is shown to be a suitable material for a ring which surrounds the outer circumference of a substrate to be processed.

Furthermore, Hirose discloses a resin layer applied to a wall surface to prevent wear to the wall surface (see paragraph 0013). Alternatively, Singh et al. discloses a carbon containing polymer layer 140 in a plasma processing chamber (see fig. 3A and its description). Moreover, Steger discloses a carbon coating formed on inner walls of the processing chamber (see abstract). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Ma et al. or Li et al. so as to have a carbon material on the inner wall surface of the processing chamber because the chamber can be easily cleaned and protected from long term wear.

Furthermore, Tahara et al. discloses a source (144a or 144b) of an additive gas containing carbon monoxide, to be added to an etching gas (142 or 143) supplied to the processing chamber (see Figs. 1-3 and their description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Ma et al. or Li et al. and Hirose or Singh et al. or Steger so as to include a gas source containing carbon monoxide to be added to the etching gas if the process being conducted within the apparatus requires such a gas.

With respect to etching an organic film, at least either a material or a size of a susceptor member disposed between said ring and an electrode is adjusted according to an area to be etched on said substrate, the flow ratio of the etching gas to the additive gas, the bias voltage applied such that silicon-based plasma products generated in a plasma process using the plasma etching apparatus can be deposited

stably on the ring, and wherein the resin layer and the additive gas are provided such that during operation of the apparatus for an etching process, wherein silicon-containing components are generated, the generated silicon-containing components bond to carbon of at least one of the additive gas and the resin layer and are evacuated from the processing chamber, the claims are directed to method limitations instead of apparatus limitations. However, since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Shan et al. modified by Ma et al. or Li et al. and Hirose or Steger or Singh et al. and Tahara et al. is capable of conducting the claimed processes. For example, note that the apparatus of Tahara et al. includes mass flow controllers 145 for controlling the flow rate of the source of carbon monoxide and the etching gas individually.

Claims 1, 3, 5, 13-14, 17-18, and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shan et al., U.S. Patent 6,232,236 in view of Nowak et al., U.S. Patent 5,865,896 or Tsukamoto, U.S. Patent 5,868,848 and, Hirose, US 2004/0211518 or Steger, U.S. Patent 5,085,727 or Singh et al., US 2004/0231800, and further in view of Tahara et al., U.S. Patent 5,356,515.

Shan et al. shows the invention substantially as claimed including a plasma etching apparatus, comprising: a ring 220 disposed on an outer circumference of a

substrate to be processed, and having a bias voltage 242 applied to the ring (see fig. 2 and its description).

Shan et al. does not expressly disclose where the ring electrode is composed of a semiconductor, a resin layer formed of a carbon material disposed on an inner wall surface of a processing chamber, and a source of an additive gas containing carbon monoxide, to be added to an etching gas supplied to the processing chamber. Nowak et al. discloses an electrode 24 composed of a semiconductor (see fig. 1 and its description). Furthermore, Tsukamoto also discloses an electrode 18 composed of a semiconductor such as silicon (see figs. 1-3 and their description). In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. so as to include a ring made of semiconductor because both Nowak et al. and Tsukamoto shows semiconductor to be a suitable material for electrodes.

Furthermore, Tahara et al. discloses a source (144a or 144b) of an additive gas containing carbon monoxide, to be added to an etching gas (142 or 143) supplied to the processing chamber (see Figs. 1-3 and their description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Shan et al. modified by Nowak et al. or Tsukumoto and Hirose or Singh et al. or Steger so as to include a gas source containing carbon monoxide to be added to the etching gas if the process being conducted within the apparatus requires such a gas.

With respect to etching an organic film, at least either a material or a size of a susceptor member disposed between said ring and an electrode is adjusted according to an area to be etched on said substrate, the flow ratio of the etching gas to the additive gas, the bias voltage applied such that silicon-based plasma products generated in a plasma process using the plasma etching apparatus can be deposited stably on the ring, and wherein the resin layer and the additive gas are provided such that during operation of the apparatus for an etching process, wherein silicon-containing components are generated, the generated silicon-containing components bond to carbon of at least one of the additive gas and the resin layer and are evacuated from the processing chamber, the claims are directed to method limitations instead of apparatus limitations. However, since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand, since a variety of methods can be done with the apparatus. The method limitations are viewed as intended uses which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Shan et al. modified by Nowak et al. or Tsukumoto and Hirose or Steger or Singh et al. and Tahara et al. is capable of conducting the claimed processes. For example, note that the apparatus of Tahara et al. includes mass flow controllers 145 for controlling the flow rate of the source of carbon monoxide and the etching gas individually.

Response to Arguments

Applicant's arguments with respect to claims 1, 3, 5, 13-14, 17-18, and 20-21 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Luz L. Alejandro
Primary Examiner
Art Unit 1763

September 14, 2006